NOTES ON NYMPHS OF THE DRAGONFLY GENUS HELOCORDULIA NEEDHAM

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The genus *Helocordulia* was described by Needham (1901, page 495) to include the species *uhleri* (Selys), recorded from Ontario, Maine, Pennsylvania, and New Jersey, and *selysii* (Hagen) from Georgia and North Carolina. *Helocordulia*, on the basis of adult structure, belongs to Williamson's (1908) Group 1 of the *Cordulinae*. Walker (1925, pages 17–18) subdivides Williamson's main group, affiliating *Helocordulia* with *Tetragoneuria* and *Epicordulia* in Subgroup A, with *Somatochlora*, *Dorocordulia*, and *Cordulia* comprising Subgroup B. There are no several characters that will separate all of the nymphs of the *Cordulinea* from those of the *Libellulinae*, so the genera of the family *Libellulidae* are keyed out together. Within the *Cordulinae*, however, the nymphs may be grouped (as genera) in the following manner:

GROUP 1. (*Helocordulia*, *Tetragoneuria*, *Epicordulia*)—Lateral spines of segment 9 reaching to tip of superior anal appendage or beyond; lateral spines of segment 8 not set at an angle to long axis of abdomen; dorsal hooks well developed, hooked and with a sharp apex; clefts of crenulations on distal margin of lateral lobe shallow or medium in depth, the lobes or teeth about as broad as long, always as broad or broader than depth of adjoining cleft.

GROUP 2. (*Neurocordulia*, *Platycordulia*)—Lateral spines of segment 9 as in Group 1; lateral spines of segment 8 set at an angle to long axis of the abdomen (not so obvious in *N. yamaskanensis* as in *N. obsolata*); dorsal hooks, especially on segments 6 to 9, knob-like with blunt rounded apex; clefts of crenulations on distal margin very deep, the lobes or teeth elongate, dorsal ones twice or more as long as broad.

GROUP 3. (*Somatochlora*, *Dorocordulia*, *Cordulia*)—Lateral spines of segment 9 reaching to or proximal of middle of superior anal appendage (in majority of species hardly reaching to base of appendage); dorsal hooks (with exception of a few species of *Somatochlora*) low rudimentary or altogether absent.

Genus **Helocordulia** Needham

The nymphs of this genus may be separated from all other members of the family *Libellulidae* by the following characters: Clefts of crenulations on distal margin of lateral lobe shallow, one-half or less as deep as lobes or teeth are broad; lobes or teeth about as long as broad, or less.

Large, cultiform dorsal hooks on abdominal segments 7 to 9; a small hook or indistinct mid-dorsal prominence on segment 6; hooks or any indications completely absent from abdominal segments 1 to 5. Lateral spines on segments 8 and 9, those of segment 8 parallel, not at an angle, to long axis of abdomen; those of segment 9 reaching to or slightly beyond tips of superior anal appendage. Superior and lateral anal appendages subequal in length; anal appendages short and stubby, considerably shorter than mid-dorsal length of segments 8 and 9. Distal half of dorsal surface of mentum with no setae (as is characteristic of *Epicordulia*).

KEY TO SPECIES OF HELICORDULIA NYMPHS

Dorsal hook on abdominal segment 6 small, but definitely a spine-like structure with an acute apex (as seen from lateral view); lateral spines of segment 8 subequal to or slightly shorter than those of segment 9 ..... **Uhleri**

Mid-dorsum of segment 6 with a thickened area, a mere suggestion of a tubercle, not spine-like and sharp pointed; lateral spines of segment 8 about one-half those of segment 9, **Selysii**

Helocordulia uhleri (Selys)

In 1939 the writer recorded *Helocordulia selysii* from Louisiana, based on two male nymphs collected in Bayou Lacombe at the State Fish Hatchery near Mandeville, La., January 9, 1938, and a female nymph from the Tickfaw River at Greensburg, La., January 22, 1938. Although these specimens did not agree in all respects with the description and figures by Kennedy (1924), they were labeled *selysii* because: 1) from known collections *selysii* is a southern and *uhleri* a northern species; 2) the presence of 7 lateral setae stated by Needham (1929) as a distinguishing character (*uhleri* having 6); and 3) the indefinite description of the dorsal hook of segment 6. At a later date, we secured a female nymph from Halls Mill Creek, Mobile County, Alabama, February 12, 1938, and a female nymph from Robinson Creek, Hardin County, Tennessee, June 2, 1945. A study of these specimens and a review of the literature showed that the Alabama and Tennessee specimens as well as those from Louisiana belonged to *uhleri*. This correction should be made to the paper by Wright (1939, page 204). The Tennessee specimen represents the first record of *uhleri*, as well as the genus *Helocordulia*, from that State.

Needham (1901) in his original description of *uhleri* states, "mental setae about 10 or 11, . . . lateral setae seven or six, when seven the basal one smaller than the others . . ." In the Handbook (1929, page 182), Needham gives 6 lateral setae as characteristic of *uhleri* and 7 setae for *selysii*. Kennedy (1924, pages 2 and 3) shows 6 lateral setae and 13 mental setae for *uhleri*. All of our specimens had 7 lateral setae and 12–14 mental setae, composed of 8 or 9 long lateral setae and 4 or 5 short medial setae. Needham (1901) describes the dorsal hook on segment "6 rudimentary, a mere low pointed tubercle." This is a confusing statement as in *uhleri* the dorsal hook of segment 6 is a definite spine-like structure. In our specimens, it is heavily set with denticles so as to somewhat obscure its shape, but viewed laterally it is definitely spine-like, and not a tubercle. Our specimens have the hook of segment 6 one-eighth or somewhat less the size of that of segment 7, and the dorsal hooks of segments 7 to 9 from one-half to as long as the segment bearing them. Lateral spines of segments 8 and 9 subequal, those of segment 9 reaching to or just beyond tips of superior appendage, but not to tips of inferiors. The nymph collected in Hardin County, Tennessee, was examined the same day found and showed the following interesting structural character: Ventral portion of distal margin of segment 9 with a row of large spine-like teeth and a series of very long hairs projecting outward in a fan-like fashion. The hairs are 1.5 to 2 mm. in length and far surpass the tips of the anal appendages. When the nymph was emersed in liquid, this structure was clearly visible. The hairs are easily destroyed after preservation of the nymph, but undoubtedly are typical of the species (and probably genus) as is indicated by remains of portions of the fan-shaped hair tuft in the specimens collected in 1938. In the Tennessee individual, a series of long hairs are present in some areas along the lateral margins of segment 9, but are missing in the greater part. All specimens examined by the writer have spine-like teeth on lateral margins of abdominal segments 2 to 9, increasing in size posteriorly; those on margins of segments 8 and 9 quite large and prominent, being 4 or 5 times the size of those on the proximal segments.

The male appendage, overlying the superior anal appendage, is rectangular in shape, covering about four-fifths of the superior appendage; the distal margin is truncate with rounded lateral angles.

Helocordulia selysii (Hagen)

The nymphal stage of this species has been very adequately described and illustrated by Kennedy (1924). As we have no specimens of *selysii* available for study, the important characters as discussed by Kennedy are given below:

Lateral setae 7; mental setae 13 or 14, composed of 8 very long lateral and 5 or 6 short medial setae. Dorsal hooks of segments 7 to 9 similar to those of *uhleri;* hooks of segment 6 a mere suggestion of a tubercle which was not visible (in exuviae) until the encrusting mud had been scraped away. Lateral spines of segment 8 about one-half the length of those of segment 9; spines of segment 9 more than one-half the length of segment 9, and reaching to tip of superior appendage.

In a letter to the writer dated February 11, 1938, Dr. C. H. Kennedy states, in answer to questions concerning the *Helocordulia selysii* nymph, "I have never felt uncertain of my identifica-

tion of my specimen and nymph taken at Raleigh. This specimen and skin are deposited in the National Museum in Washington so I am not able to study them further. However, before Williamson died he told me he felt very sure that the thing which I called *Helocordulia* was one of the southern species of *Tetragoneuria*. My memory is that he thought it was probably *petechialis*." I have not examined Kennedy's specimens of *selysii*, but, from the characters of the exuviae, it belongs without doubt to the genus *Helocordulia*. Our reasons for this statement are as follows: 1) its close similarity of the nymph of *uhleri*, found in New York by Needham (1901); 2) all of the known nymphs of *Tetragoneuria* and *Epicordulia* have dorsal hooks on segments 2 to 9, the lateral spines of segment 9 are as long or longer than the segment and reach or exceed the tips of the inferior anal appendages; and 3) the separation of the exuviae described by Kennedy from all other genera of *Cordulines* by characters given in the discussion of the generic groups listed in the beginning of this article. It is of interest to note that *Tetragoneuria petechialis* Muttkowski is very close to and often considered a variation of *T. stella* Williamson. The nymph of *petechialis* is unknown, but that of *stella* has been described by supposition and is typical of *Tetragoneuria* in having a complete set of dorsal hooks and long lateral spines on segment 9. There are no other dragonfly nymphs in our faunal area having the combination of characters possessed by *Helocordulia uhleri* and *selysii*.

REFERENCES CITED

Kennedy, C. H. 1924. Notes and descriptions of naiads belonging to the dragonfly genus Helocordulia. Proc. U. S. Natl. Mus. 64(12): 1–4.

Needham, J. G. 1901. Aquatic insects in the Adirondacks. N. Y. State Mus. Bull. 47: 429–540.

Needham, J. G. et al. 1929. A handbook of the dragonflies of North America. C. C. Thomas, publishers, Springfield, Illinois.

Walker, E. M. 1925. The North American dragonflies of the genus Somatochlora Univ. Toronto Stud. Biol. Ser. No. 26.

Wright, M. 1939. Additions to the list of Anisopterous dragonflies of the Central Gulf Coast Region. Jour. Tenn. Acad. Sci. 14(2): 203–208.